

Case Study Aamala Marina Village

Project profile

Objective

To provide a modern and sustainable solution that prevents flooding and pollution of flows before they are discharged to a stormwater outfall, into the Red Sea.

Solution

Hydro International proposed a modular geocellular tank to store peak flow volumes and discharge them gradually overtime to an effluent pipe.

Background

Amaala is part of a major coastal development near the Red Sea; an ultra-modern development where sustainability and innovation are at the heart of this transformative project.

Amaala's commitment to environmental stewardship aligns with Saudi Arabia's accelerating infrastructure resilience under Vision 2030; where sustainable drainage systems play a vital role in managing surface water, protecting ecosystems, and enhancing resilience.

Intense rainstorms and runoff pose risks of flooding and pollution, if not managed properly.

In this strategic setting, the stakeholders involved in this project aimed to design an advanced, sustainable and low-impact drainage solution that would fit local sustainability goals and technical regulations.

Our client, Water Secret, required Hydro International's 40+years of experience in managing stormwater to find the right solution for this specific project.

For this development, Hydro International recommended the use of Geoplast's Aquabox STR as a means to attenuate flows.

The challenge

The developer needed an efficient, scalable stormwater attenuation system that complied with strict water regulations and used sustainable materials. The solution had to handle large runoff volumes from impervious surfaces while meeting the master plan's environmental targets.

It also needed to fit under infrastructure areas (roads and parking) subject to heavy vehicle loads. In short, the team sought an underground tank that could store peak flows safely, release them controllably, and be built with industrial recycled materials.

Product profile

The Aquabox STR module from our associate in the Middle East, Geoplast, is an underground, recycled plastic module in which water is collected and stored. The aim of this system is to collect the rainwater temporarily and release it gradually into the sewage infrastructure, reducing peak loading on the sewer network, and preventing flooding in urban areas.



The solution

To meet these requirements, a modular geocellular tank was selected. Water Secret required a large underground storage tank and Hydro International proposed Geoplast's Aquabox STR high quality, industrial-recycled polypropylene modules. Some of the benefits of this product are:

- High load resistance
- Fast and easy installation
- Ease of inspection and maintenance

The assembled tank measured roughly 35 m × 35 m in footprint and 1.5 m deep, constructed from stacked Aquabox blocks. Each Aquabox STR module is made of 100% recycled polypropylene and is rated for SLW 30 (HGV 30) traffic. The open cavity design yields an extremely high void ratio – about 96% of the basin volume can store water.

Aquabox STR module has a long-term certification with long term test according with CIRIA C737 and UNI EN 17151-1 which ensure long term resistance for 50 years.

Nearly the entire tank volume holds stormwater, far more than a traditional gravel pit. In practice, the tank works by collecting runoff through inlet pipes; water then fills the module cavities. standard rainwater filters and flow-control devices.

The system includes built-in access points and inspection ports, and it integrates easily with standard rainwater filters and flow-control devices.

Specifications

The design of the tank was tailored to the site needs. Inlets from the adjacent drainage network enter the basin through polyethylene pipes.

Each Aquabox module holds about 0.43 m³ of water, so the completed system's capacity is effectively over 1830 m³. The modules "nest" and stack together, allowing many to be shipped per truckload.

For example, one flatbed can carry in the order of 450 m³ of storage volume. Pipes and inspection manholes were designed with minimal excavation – only about 10 cm gravel bedding and a 35 cm cover of stone are needed over the tanks.

All materials are saltwater resistant, and the polypropylene blocks have an expected life of decades. In operation, the system detains storm surges, releasing them slowly to prevent downstream flooding while providing infiltration opportunities back to the coastal aquifer.

Installation and maintenance

Thanks to the Aquabox STR modular system, installation was straightforward. The Aquabox units arrived, palletised on trucks, greatly reducing logistics. In fact, stackable blocks allow roughly 453 m³ of storage to be delivered in a single load.



At the site, the team prepared the excavation with a geotextile and sand/gravel levelling layers. The lightweight crates were then placed by crane and "snapped" together – a process Hydro International notes is "quick to install" for such modular systems.

As shown above, hundreds of blocks were assembled into the long, rectangular tank footprint with minimal heavy equipment.

Once in place, the system was backfilled and covered as per normal road-base construction. Maintenance is also simple: each Aquabox STR tank is fully accessible for inspection and cleaning.

Collaborative impact and future potential

This project highlights the value of close cooperation between the distributor (Water Secret), the manufacturer (Geoplast), and the technical expert (Hydro International).

Water Secret came to Hydro International looking for our expertise and technical advice in managing stormwater effectively and Hydro International recommended Geoplast's modular geocellular tank solution.

By working together, the team delivered a sustainable stormwater solution that met all the design criteria. The local development authority approved the proposal quickly thanks to the clear technical advantages.

The modular geocellular storage solution is already being deployed across Saudi Arabia as a reliable attenuation method. The success of this installation demonstrates how similar solutions can be applied at other sites – providing scalable, regulation-compliant stormwater management for the Saudi Arabia's Kingdom rapid growth.

Learn more

To learn more about how we can help you with your next stormwater project, visit hydro-int.com or contact us:

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